Building Strong®

DISCOVER | DEVELOP | DELIVER

EASEE

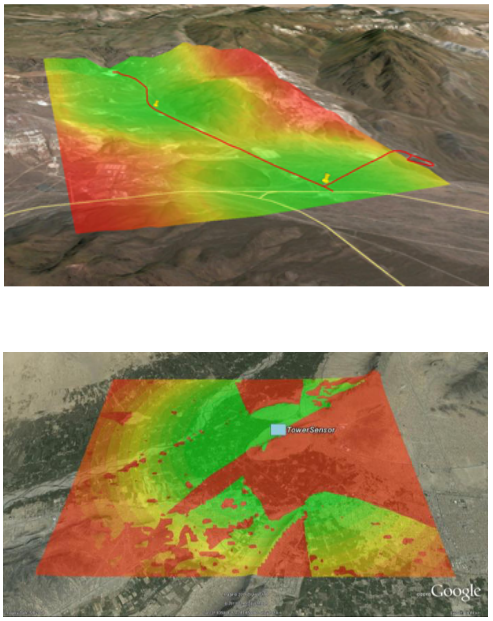
Environmental Awareness for Sensor and Emitter Employment

EASEE provides advanced modeling of battlefield signals and sensors, to help warfighters optimally select and position force protection sensors, identify signal detection vulnerabilities, plan covert operations, lay out sensor networks for identifying and tracking hostile forces, and many other applications. These capabilities are provided in a robust software architecture that can be run on a laptop or desktop.

Critical Situational Awareness at Your Fingertips

Sensing and target recognition play an increasingly important role in a variety of battlefield and security applications, and are a key enabler for many of the Army modernization priorities. However, real-world sensor performance is heavily impacted by terrain conditions and changing weather, which makes it challenging for non-experts to select and place sensors in a manner optimal to accomplishing their mission. EASEE provides a unified framework enabling warfighters to maximize benefits of increasingly complex sensor technology, without extensive training.

The EASEE software framework incorporates advanced, computationally efficient acoustic, infrasonic, seismic, infrared (IR), visible, radio-frequency (RF), and chemical/biological modeling capabilities. Its highly flexible, Java-based software design enables it to be rapidly adapted to a variety of user environments.



Example showing areas of detection (green) and nondetection (red). Top: acoustic detection along the route of a UAS. Bottom: IR camera detection of a human.

Capabilities

- Realistic, physics-based modeling of terrain and weather impacts on signals and sensors
- Flexible software architecture accommodates all types of signal modalities (acoustic, seismic, IR, visible, RF, CBRN, …)
- Rapid optimal selection and placement of sensors given target type, sensor availability, and terrain characteristics
- Highly modular, object-oriented software design is easily adapted to a variety of applications

Sample Applications

- Optimize selection and placement of sensors to protect facilities
- Air and missile defense planning
- Identify terrain and weather dependent coverage gaps in sensor network
- Ingress/egress route planning to maximize covertness
- Detectability of emissions and modeling of communication distances

The U.S. Army Engineer Research and Development Center (ERDC) solves the nation's toughest engineering and environmental challenges. ERDC develops innovative solutions in civil and military engineering, geospatial sciences, water resources, and environmental sciences for the Army, DOD, civilian agencies, and our Nation's public good. Find out more on our website: www.erdc.usace.army.mil.
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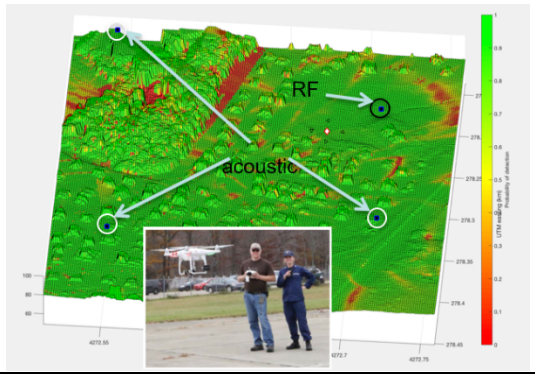
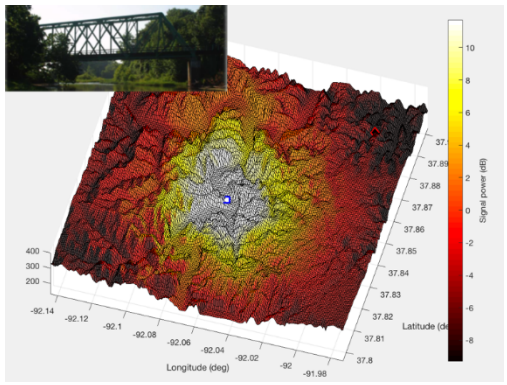
Current Status

- Version 4, now available, enables calculations with complex terrain properties and 3D atmospheric fields. These capabilities are leveraged by many advanced signal transmission models in EASEE including parabolic equation methods for acoustics and probabilistic line-of-sight calculations with vegetation and buildings.
- Core functionality (the "EASEE OS") is at Technology Readiness Level (TRL) of 6. New capabilities are being spiraled in, particularly for RF, imaging, and chem-bio modeling, which have lower TRL (3-5).
- User-friendly, MATLAB-based "standalone" version available for Windows or Mac operating system.
- ArcGIS EASEE toolbar provides a seamless way to run EASEE calculations within ArcMap 10.4.
- EASEE Web Service facilitates integration into a variety of web-based computing environments.
- Transitions funded by the Army Rapid Innovation Fund (RIF) and Physical Security Enterprise Analysis Group (PSEAG). Other transitions include the JPEO CBRND, NGIC, and U.S. Coast Guard.



Optimized sensor selection and placement for UAS detection in urban terrain



Modeled propagation of infrasound from a bridge in hilly terrain

Features

- Simple mouse- and menu-driven interfaces
- Utilizes high-resolution, terrain elevations, land cover, and 3D atmospheric data
- Full 3D platform directionality effects and rotations on signal emissions and propagation
- Animation control to display evolving sensor coverage
- Acoustic and seismic target signature databases
- Sensor and human auditory models
- Automated assessment of uncertainties for predictions

Background & Collaboration

EASEE's unique, patented modeling framework segments signal modeling problems into a sequence of steps and interfaces from emission through sensing and processing. Developed primarily by ERDC's Cold Regions Research and Engineering Laboratory (CRREL), all five military services and numerous governmental organizations have utilized EASEE. ERDC CRREL is interested in collaborating with partner agencies to enhance EASEE's capabilities to target your specific needs. Please contact us today to see how we can partner to tailor EASEE's abilities to suit your needs.

Distribution

EASEE is available to government and DoD agencies upon request. Further distribution of the software without permission from ERDC is prohibited. Technical documentation and strategic plan are available upon request.

ERDC Point of Contact

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